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Low Frequency of Intestinal Metaplasia in Gastric Biopsies from Mexican Patients: A Comparison with Japanese and Swedish Patients

Carlos A. Rubio[1] and José Jessurun[2]

Department of Pathology, Hospital General, Universidad Autonoma, Mexico, DF, Mexico

A systematic analysis of the cellular and structural components of intestinal metaplasia (IM) was carried out in 691 consecutive endoscopic gastric biopsies from Mexicans patients. Two-thirds of the patients (461 or 66.7%) had chronic gastritis, 27.6% (or 191 patients) had gastric ulcers and 5.6% (39 patients) gastric carcinomas. IM was found in 17.4% of the gastric biopsies. While IM was present in 27.7% of patients with gastric peptic ulcer, patients with gastric malignancy had only 18.7%, and the lowest rate (13.4%) was found in 461 biopsies from patients with chronic gastritis. IM was influenced by the age but not by the sex of the patients. Only one of 120 biopsies with IM (0.8%) had incomplete IM (a lesion claimed to be a precursor of gastric carcinoma). In a previous study it was found that 32.3% of 359 Swedish patients and 59.2% of 625 Japanese patients with chronic gastritis had IM, the proportion of incomplete IM being 23.3% and 25.1%, respectively. The low frequency of IM among Mexicans (a population with a low incidence of gastric carcinoma), contrasts with the moderate frequency of IM among Swedes (who have a moderate gastric cancer incidence) and with the high frequency of IM among Japanese (with a high incidence of gastric carcinoma). These findings recorded in disparate geographical regions strongly support the view that IM is a lesion evoked by environmental factors and associated with gastric carcinogenesis.

Key words: Gastric biopsy — Intestinal metaplasia

Despite declining incidence in most parts of the world, gastric carcinoma remains the most common cancer form for the population as a whole.[1)] The causes leading to gastric carcinogenesis are unknown.[2)] On the other hand, there is an increased awareness that certain histological alterations of the gastric mucosa may predispose, antedate or be concurrent with the development of gastric carcinoma. Those alterations are: a) chronic (atrophic) gastritis,[3)] intramucosal cysts,[4, 5)] dysplasia,[6)] adenomatous polyps[7)] and intestinal metaplasia.[8, 9)] That intestinal metaplasia (IM) may be related to gastric carcinogenesis is based on the following observations: a) IM increases with increasing age (the latter being a high risk factor for cancer development,[10)] b) IM is often present in stomachs with gastric carcinomas, particularly those of intestinal histologic type,[8)] c) IM is usually found in Japanese males (more affected by gastric carcinoma than Japanese females,[11)] d) IM often surrounds foci of minimal invasive gastric carcinoma (i.e. less than 5 mm,[12)]) e) IM is more often found in countries with a high incidence of gastric carcinoma than in countries with a much lower incidence,[13)] and f) IM is found in the gastric mucosa of rats having experimentally induced highly differentiated adenocarcinomas.[14)] The comparative study on the occurrence of the IM mentioned in point e) refers to a report on gastric specimens from Japanese and American patients collected at autopsy.[13)] The results demonstrated that 29% of 260 Japanese patients (an ethnic group with a high incidence of gastric carcinoma, namely 85 cases/100,000 males) had IM while only 8% of 350 Americans (a population with only 10 gastric carcinomas/100,000 males) had IM.

In recent years we have studied the frequency of IM in gastric biopsies from different ethnic groups.[15)] We found IM in 59.2% of 625 Japanese patients but only 32.3% of 359 Swedish patients (a population with a lower incidence of gastric carcinoma than the Japanese, namely 24 cases/100,000 males). In the present work, we have analyzed the frequency of IM in gastric biopsies from Mexican patients, a population with a very low incidence of gastric carcinoma, namely 4 cases/100,000 males. The results are reported below.

MATERIALS AND METHODS

The material consisted of 691 gastric biopsies from Mexican subjects obtained under direct visual endoscopic control in patients having a variety of epigastric complains. All biopsies were fixed in 10% neutral formalin and sections were stained with hematoxylin-eosin (H & E). In all cases two or more biopsies were taken from the antrum and the fundus at one endoscopic section.

[1] Present address: Department of Pathology, Karolinska Hospital, S-104 01 Stockholm, Sweden.

[2] Present address: Department of Laboratory Medicine and Pathology, University of Minnesota, Twin Cities, 420 Delaware Street, S.E. Minneapolis, Minn., USA.

Patients were grouped into those having clinical and/or histopathological evidence of gastric peptic ulcer, adenocarcinoma or chronic gastritis. Special attention was paid to the presence of IM. When IM was present, the following histological parameters were recorded separately: a) cellular components: goblet cells, columnar cells with striated (i.e. absorptive) border, and Paneth cells; b) structural component: villous-like formations. The criteria used to define cellular and structural components, have been presented elsewhere.[15] IM was divided into complete and incomplete types[13] as follows. Complete: when goblet, columnar, absorptive cells and/or Paneth cells were present. Incomplete: when only goblet cells were present.

RESULTS

From a total of 691 gastric biopsies, 461 (i.e. 66.7%) were from patients with chronic gastritis, 191 (27.6%) from patients with gastric ulcers and 39 (5.6%) from those with gastric carcinomas. Of the total of 691 biopsies, 120 (17.4%) had IM. Of the 191 biopsies from patients having gastric peptic ulcer, 27.7% had IM, and 18.7% had IM from those with gastric malignancy (Table I). The lowest rate (13.4%) was found in the 461 biopsies from patients with chronic gastritis.

IM and sex As shown in Table I, male and female patients having chronic gastritis or peptic ulcer, had similar rates of IM, but IM was higher in female patients with gastric carcinoma.

IM in older patients (>60 years) As shown in Table I, 32.1% of 81 gastric ulcer patients 60 years of age or older had IM, the rate for older patients with gastric malignancy being 21.7% and that for patients with chronic gastritis, 20.6%.

Complete or incomplete IM Of the 120 biopsies with IM, 119 (99.1%) had complete-type IM and the remaining one had incomplete IM. The case with incomplete IM was found in a 42-year-old male having chronic gastritis.

DISCUSSION

In the present study, 17.4% of the 691 Mexican patients had IM. This low percentage contrasts with studies carried out in other ethnic groups.[15-19] Two-thirds (66.7%) of the patients in the present study had chronic gastritis only. In this group, IM was found in 13.4% of the cases. In another study with 984 gastric biopsies from patients with chronic gastritis[15] we found IM in 32.3% of those from Swedish patients and in 59.2% of those from Japanese patients. The causes responsible for the difference in IM among those two ethnic groups in-

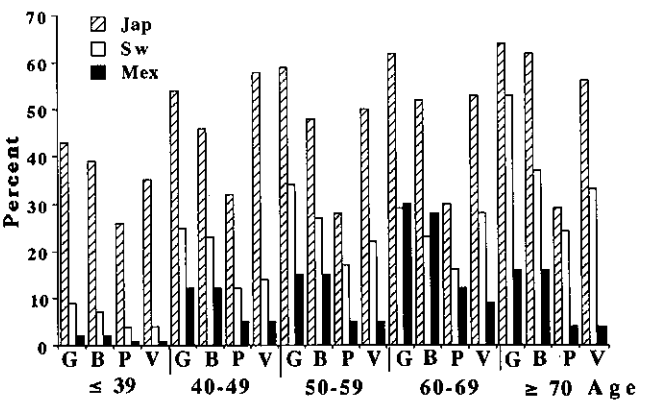

Fig. 1. Age and the cellular components of intestinal metaplasia (G, goblet cells; B, columnar cells with border; P, Paneth cells) as well as structural mucosal changes (V, villous-like formations) in gastric biopsies from 461 Mexican patients without ulcer or carcinoma.

Table I. Intestinal Metaplasia Present in Gastric Biopsies, Correlated to Age and Sex in 691 Mexican Patients Having Either Peptic Gastric Ulcer (191 Patients) Adenocarcinoma (39 Patients) or Chronic Gastritis (461 Patients)

	Peptic ulcer		Adenocarcinoma		Chronic gastritis		All	(%)
	Male	Female	Male	Female	Male	Female		
20–29	—	0/5	—	0/1	1/28	0/39	1/73	(1.4)
30–39	1/15	0/11	—	0/3	0/32	4/43	5/104	(4.8)
40–49	3/14	6/16	1/3	0/2	9/45	4/43	23/123	(18.7)
50–59	9/28	6/21	0/4	1/3	4/40	12/55	32/151	(21.2)
60–69	13/45	6/24	1/8	2/5	9/37	15/48	46/167	(27.5)
70–79	0/5	6/4	1/3	0/4	1/17	3/28	11/61	(18.0)
>80	0/1	1/2	0/1	1/2	0/1	0/5	2/12	(16.7)
All	26/108	25/83	3/19	4/20	24/200	38/261	120/691	
(%)	(24.1)	(30.1)	(15.8)	(20.0)	(12.0)	(14.6)	(17.4)	

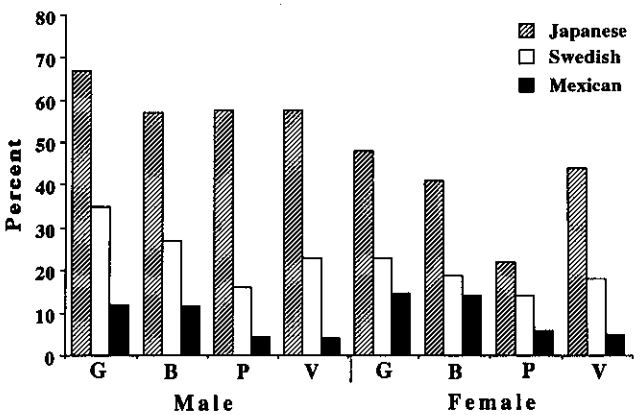

Fig. 2. Sex and the cellular components of intestinal metaplasia (G, goblet cells; B, columnar cells with brush border; P, Paneth cells) as well as structural mucosal changes (V, villous-like formations) in gastric biopsies from 461 Mexican patients without ulcer or carcinoma.

vestigated, as well as in Mexicans, remains unclear. Inter-observer variations should be disregarded since the same observer (C.R.) reviewed all biopsies. The other possibility is that Japanese endoscopists recognized more readily gastric areas with IM for tissue sampling than Swedish endoscopists and Swedish more readily than Mexican endoscopists. While these possibilities can not be completely disregarded it should be mentioned that many Swedish endoscopists received training at Japanese institutions. The third possibility is that Mexican endoscopists took fewer biopsies than Japanese endoscopists. However, this was not the case since the number of gastric biopsies obtained in patients with chronic gastritis (i.e., without ulcers or carcinoma) was usually two (one from the antrum and one from the corpus). From the above, it may be inferred that the difference in frequency of IM between Mexican, Swedish and Japanese patients with chronic gastritis may be due to reasons other than the endoscopists' experience, inter-observer variations or differences in the number of biopsies obtained at endoscopy.

It is known that IM increases with age (see Fig. 1). In the present material 19.7% of the patients were >60 years of age. In a previous report,[15] the proportion of elderly Japanese patients (>60 years) was more than twice as much, namely 41.8% and that of elderly Swedish patients was 50.9%. In spite of this, IM among the Swedish group was only half as frequent as in the Japanese. Thus, the low proportion of elderly Mexican patients is not the only explanation for the lower percentage of IM recorded in the present work. To further investigate the significance of age in the occurrence of IM, elderly patients were specially studied. The results indicate that 20.6% of elderly (>60 years) Mexican patients had IM, the rate for 183 elderly Swedish patients being 41.3% and for 261 elderly Japanese patients, 64.1%.[15] Obviously, even in elderly patients, IM was lower in Mexicans than in the other two ethnic groups.

It has been claimed that incomplete IM (i.e., when only goblet cells are present) may antedate gastric carcinoma.[2] Because of this, many authors have assumed that incomplete intestinal metaplasia may be a specifically important precancerous lesion of the stomach. In an early study of 984 gastric biopsies[15] incomplete IM was found in 23.3% of the Swedish patients and in 25.1% of the Japanese patients. It is remarkable, therefore, that the proportion of incomplete IM found among Mexican nationals was only 0.8%. Figure 2 shows that the percentage of the cellular and structural components of IM were similar in male and female Mexican patients while it was slightly higher in male Japanese and Swedish patients. The reason for this remains unclear.

Epidemiological studies have demonstrated that Japanese who have migrated to Hawaii experience a decreased frequency of gastric carcinoma.[20] Interestingly, Japanese in Hawaii also experienced a decreased frequency of gastric IM.[21] Those results are in concordance with the present studies. That is, we found a low frequency of IM (including incomplete IM) among Mexicans (a population with a low incidence of gastric carcinoma), a moderate frequency of IM among Swedes (with a moderate incidence of gastric carcinoma) and high frequency of IM among Japanese (an ethnic population with a high incidence of gastric cancer). These findings recorded in disparate geographical populations strongly support the view that IM is a lesion evoked by local environmental factors. Moreover they substantiate the theory that IM is a lesion associated with gastric carcinogenesis, an opinion not shared by some authors.[22-25]

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